Geophysical Research Abstracts,
Vol. 11, EGU2009-13164, 2009
EGU General Assembly 2009

Use of ALS data for digital terrain extraction and roughness parametrization in floodplain areas

B. Idda, C. Nardinocchi, and M. Marsella
University of Rome La Sapienza, DITS, Roma, Italy (maria.marsella@uniroma1.it)

In order to undertake structural and land planning actions aimed at improving risk thresholds and vulnerability associated to floodplain inundation, the evaluation of the area concerning the channel overflowing from his natural embankments it is of essential importance. Floodplain models requires the analysis of historical floodplains extensions, ground's morphological structure and hydraulic measurements. Within this set of information, a more detailed characterization about the hydraulic roughness, which controls the velocity to the hydraulic flow, is a interesting challenge to achieve a 2D spatial distribution into the model.
Remote sensing optical and radar sensors techniques can be applied to generate 2D and 3D map products useful to perimeter floodplains extension during the main event and extrapolate river cross-sections. Among these techniques, it is unquestionable the enhancement that the Airborne Laser Scanner (ALS) have brought for its capability to extract high resolution and accurate Digital Terrain Models. In hydraulic applications, a number of studies investigated the use of ALS for DTM generation and approached the quantitative estimations of the hydraulic roughness.
The aim of this work is the generation of a digital terrain model and the estimation of hydraulic parameters useful for floodplains models from Airborne Laser Scanner data collected in a test area, which encloses a portion of a drainage basin of the Mela river (Sicily, Italy). From the Airborne Laser Scanner dataset, a high resolution Digital Elevation Model was first created, then after applying filtering and classification processes, a dedicated procedure was implemented to assess automatically a value for the hydraulic roughness coefficient (in Manning's formulation) per each point interested in the floodplain. The obtained results allowed to generate maps of equal roughness, hydraulic level depending, based on the application of empirical formulas for specific-type vegetation at each classified ALS point.